

WHAT IS CLAIMED IS:

1. A satellite system, comprising:

a plurality of satellites in inclined elliptical orbits, each said satellite communicating with a land mass on the Earth, at least a first group of said satellites being in common orbits having the same, first, repeating ground track communicating with first plural specified land mass on the earth, and a second group of said satellites being in common orbits having the same, second, repeating ground track, different than said first ground track, and communicating with second plural specified land masses on the earth each said satellite communicating during only a portion of the elliptical orbit closest to apogee.

2. A constellation as in claim 1, wherein said only a portion is approximately 60% of its total orbiting time.

3. A constellation as in claim 1, wherein said first and second land mass locations represent populated portions on the earth.

4. A constellation as in claim 3, further comprising a third group of said satellites being in common orbits having the same, third ground track, different than said first and second ground tracks.

5. A communication system, comprising:

a plurality of ground stations, each including communication equipment for communicating with a satellite in orbit; and

a plurality of satellites in respective orbits, said respective orbits including a first sub-constellation orbit with a plurality of satellites therein, each of said plurality of satellites following a repeating ground track that repeats an integral number of times each day and each repeating ground track optimized for covering more than one specific land mass on the earth, including a first sub-constellation optimized for covering first land masses, a second sub-constellation optimized for covering second land masses, and a third sub-constellation optimized for covering third land masses.

6. A constellation as in claim 1 wherein the apogee of

the satellites are approximately  $3/4$  the altitude or less of geo stationary satellites.

7. A constellation as in claim 1 wherein each ground track covers three continents.

8. A communication system, comprising:  
a plurality of ground stations on respective land masses;  
and  
a plurality of satellites in elliptical orbits, said plurality of satellites being in orbits in sub-constellations, each sub-constellation having a plurality of satellites and repeating ground tracks, which repeating ground tracks are each optimized to follow a plurality of said land masses, each satellite operating only during a predetermined percentage of its orbit closest to its apogee.

9. A constellation as in claim 8 wherein said satellites transmit only during 60 percent of their orbit.

10. A constellation as in claim 8 wherein said satellites are approximately  $3/4$  of the height necessary for

geosynchronous orbit or less.

11. A constellation of satellites, comprising:

plurality of satellites in elliptical orbits around the earth with the earth at one focus of the elliptical orbit, and each elliptical orbit having an apogee and a perigee, each said satellite communicating with a portion of the Earth,

at least a first group of said satellites being in common orbits having the same, first, ground track, and a second group of said satellites being in common orbits having the same, second, ground track, different than said first ground track, wherein each of said satellites is active for only a predetermined portion of its orbiting time, closest to its apogee portion, and wherein the satellites in said first group and said second group are spaced such that when a first satellite in the subconstellation reaches its inactive portion, another satellite in the subconstellation becomes active.

12. A constellation as in claim 11, wherein a first satellite is descending when it becomes inactive, and another satellite is ascending when it becomes active.